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U. S. DEPARTMENT OF AGRICULTURE

marketing FROZEN bread

A Preliminary Report

AMS- 395

Market Development Research Division
Agricultural Marketing Service
UNITED STATES DEPARTMENT OF AGRICULTURE

PREFACE

Part of the program of marketing research conducted by the United States Department of Agriculture has as its objective the evaluation of new products or processes in terms of their probable impact on consumption and on returns to producers. One such new process is the proposed freezing of bakery products. Considerable research effort both by Government and private laboratories has gone into defining the technological conditions under which bread and other bakery products should be frozen, stored, and thawed to maintain optimum quality. The results of these studies have been published widely.

This report is based on exploratory work on the economics of distribution of frozen bread. From collected data and certain assumptions, marketing costs for frozen distribution were compared with those for the conventional method of distribution. The Department expects to continue work in this area. Detailed consideration will be given to the various economic aspects of producing and distributing frozen bakery products.

This report was prepared under the general supervision of Marshall E. Miller of the Market Development Research Division, Agricultural Marketing Service. Clyde L. Rasmussen of the Western Utilization Research and Development Division, Agricultural Research Service, assisted in the overall planning of the study.

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MARKETING FROZEN BREAD: A PRELIMINARY REPORT

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SUMMARY

Marketing costs for bread have increased rapidly in the past 10 to 15 years. Wholesale bakers have been seeking ways to improve the efficiency of marketing their products and have explored several plans for achieving this. None of these, however, has been widely put into practice.

The analysis in this report indicates that a decrease in marketing costs may be achieved by still another method: Bread can be distributed as a frozen food. This would permit less frequent delivery, and eliminate stale bread losses.

To make it possible to use available cost data, it was assumed that frozen bread could be distributed through frozen food channels and with the markup customary for frozen foods. It was estimated that bread could be marketed in this way at a saving of 2 cents per pound loaf even after allowing for the additional costs of freezing and handling.

Cost, however, is only one of the factors to be considered in evaluating the acceptability of frozen bread. It is not known how well consumers will accept the new form of product, or whether bakers and retailers will be willing to adopt the new system of distribution. Alternative systems of distribution, such as the drop-delivery system, by which the route salesman leaves bread at the retail store and store personnel maintain displays, could result in savings roughly equivalent to those estimated for frozen distribution. With these methods, as with frozen distribution, the wholesale baker would lose control over displays. Therefore, it is possible that a shift to frozen distribution might induce wholesale bakers to compete by increased use of other forms of promotion, the cost of which might tend to offset gains in efficiency brought about by frozen distribution. Against this, the consumer would likely find higher quality in the frozen bread.

INTRODUCTION

The retail price of bread has risen more in the postwar period than that of any other major food product except coffee. Between 1948 and 1958, the retail price of a 1-pound loaf of white bread rose from 13.9 cents to 19.3 cents,

an increase of 39 percent (13). 1/ These prices are based on sales of bread through the channel of wholesale baker to retail grocer, the predominant distribution channel. During the same period the consumer price index increased about 24 percent. A breakdown of the elements that made up prices of bread sold through the wholesale baker-retail grocer channel of distribution in 1948 and 1958 is shown in figure 1.

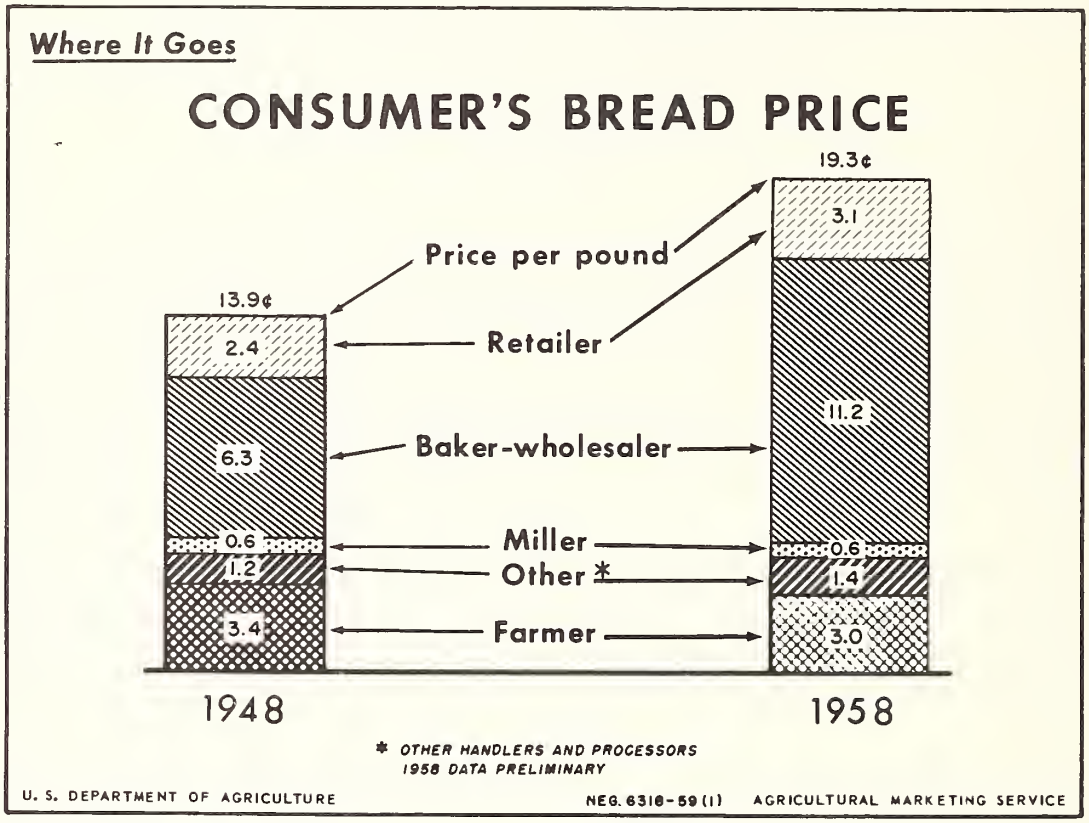

Figure 1

About 90 percent of the increase in price during the 10-year period was in the baker-wholesaler margin, which in 1958 accounted for 58 percent of the total retail price. This increase is attributed to higher costs for baking and wholesaling, including higher wage rates, salaries, commissions; also to higher delivery costs that are partially due to decreased route volumes of wholesale bakeries. These route volumes, which had increased during the war years, declined 28 percent between 1945 and 1953 (10). An independent bakers' cooperative estimates that declines in route tonnage amounted to 24 percent between 1950 and 1958 (3).

Because bread is such an important item in the average family's expenditure for food there is a great deal of interest in finding ways of decreasing

1/ Underscored figures in parentheses refer to Literature Cited at the end of this report.

bread prices. Since the major part of the retail price for bread is in the baker-wholesaler margin, one may assume that attempts at decreasing the price to the consumer would be most productive if applied in this segment.

By freezing, certain economies in production and distribution appear to be possible that may more than offset the added costs of freezing. Bakeries may achieve some economies by preparing baked products in large batches to be held in a frozen storage inventory rather than preparing small batches for a fluctuating daily demand. Delivery costs would be reduced by less frequent and more efficient delivery, and the staling problem would be eliminated.

CURRENT USES OF FREEZING BY BAKERS

A considerable amount of research, both by Government laboratories and the baking industry, has been done to develop specifications of conditions under which bread and other bakery products should be frozen, stored, and thawed for maintaining optimum quality. Taste panel evaluations and objective measurements indicate that under optimum conditions of handling the flavor, firmness of crumb, and other characteristics of most frozen bakery products are barely distinguishable from the freshly baked. The optimum conditions for freezing, storing, and thawing bread products and their effects on product quality have been described in detail in other publications (1, 5, 6, 7).

Retail bakeries have been using freezing in one way or another for a number of years. A survey by the Gumpert Company in 1956 revealed that 62 percent of retail bakers were then using freezing (4). The survey did not reveal the types and quantities of baked items that were frozen nor the amount sold to consumers in frozen form. It is generally known, however, that many retail bakeries freeze at least part of their specialty items, primarily to have a full line of products on hand at all times. This enables them to take advantage of certain economies made possible by producing in large quantities, and freezing the amount not required currently for later use. In most cases the products are defrosted before being sold to the consumer.

Increasing numbers of wholesale bakers are using freezing in much the same way that retail bakers do. They freeze products for delivery to markets that are located some distance from their plants (11). In the latter case frozen products are delivered to the distant markets and kept in frozen storage until just before delivery to retail outlets; then they are defrosted. Presumably, wholesalers using freezing in this way find it more economical than operating out of smaller local plants or making daily delivery of freshly baked items to distant markets. Thus far, bread products handled in this manner have been specialty items.

Most observers and baking industry spokesmen agree that such uses of freezing will continue to expand. There is not unanimous agreement, however, on two other proposed uses of freezing:

(1) Fixed quantities of bakery products could be produced by wholesale bakeries on a regular production schedule. A frozen inventory of all products would be maintained to take care of fluctuations in dairy demand. Presumably,

this would result in lowered production costs because of reductions in changeover time, clean-up time, and possibly in use of work time between 6:00 p.m. and 6:00 a.m., when a higher rate of pay is in effect in most areas. Because of reductions in clean-up and changeover time, equipment could be used at capacity rates for more hours per week than when production is adjusted to meet fluctuations in daily demand. This more efficient use of production equipment would result in somewhat lower fixed costs per unit of output. Final appraisal of the economics of this use of freezing would, of course, depend upon whether or not the costs of freezing would more than offset the efficiencies made possible on the production side. If the products were defrosted before delivery to the retail store, no changes would be necessary in present methods of distribution.

(2) Another proposal would be to market the frozen bakery products as frozen foods at the retail level. This would, of course, have to be accompanied by changes in methods of distribution. A limited number of frozen baked specialty items already are available in retail stores, but what are the possibilities of a wide-scale adoption of marketing bread in frozen form?

POSSIBILITIES OF MARKETING BREAD AS A FROZEN FOOD

At least three important criteria need to be considered. These are (a) the costs of marketing frozen bread as compared with present or other methods of handling without freezing, (b) the acceptance of frozen distribution by wholesale bakers, and (c) retailer and consumer acceptance of frozen bread. Only the first two of these points are given detailed consideration at this time.

The distribution of frozen bread could be accomplished in either of 2 ways:

(1) Bread could be frozen at the wholesale bakery and delivered in refrigerated trucks directly to retail stores. Delivery could be daily, or every other day, or even less frequently, provided adequate frozen storage and display space were made available in the retail stores. The most economic combination of available frozen storage and display space, and frequency of deliveries, could be ascertained through economic and engineering studies.

(2) A more immediate possibility for distributing bread as a frozen food, however, would be through already available frozen food channels, though frozen food distributors might not accept frozen bread for distribution, and wholesale bakers might not wish to lose control over distribution and display of their individual brands. The adoption of either of these alternatives would depend upon the willingness of retailers to devote freezer cabinet space to bread and upon the acceptance of frozen bread by consumers.

Estimated Cost

Whether retail grocers will be receptive to the idea of handling frozen bread would seem to hinge largely on the economics of the methods of handling. Let us assume that a baker could deliver freshly baked bread to a nearby frozen food distributor at a cost not in excess of savings made possible by the improved efficiency in his plant. He could deliver bread to the frozen food

distributor's dock at a price that would be about equal to the bakery dock price with current operating practices. The price of bread at the wholesale baker's dock is equal to the retail selling price less the retail margin and the baker's selling and delivery margin.

In 1955, the U. S. Department of Agriculture estimated the selling and delivery margin to be about 26 percent of the wholesale selling price (12). That same year, a Chicago independent bakers' cooperative estimated this expense to be equal to 28.5 percent of wholesale sales (3). This expense has risen steadily and according to the same bakers' cooperative had reached 31.3 percent in 1958. The increase is attributed largely to declines in tonnage of product delivered over routes that had remained essentially the same.

Thus, starting with the 1958 average retail price of 19.3 cents per 1-pound loaf and deducting the retailer's margin of 3.1 cents, and estimated selling and delivery expenses of 5.1 cents--calculated by multiplying the wholesale price of 16.2 cents by 31.3 percent--we arrive at an estimated price of 11.1 cents per 1-pound loaf at the frozen food distributor's dock. If the bakery and freezer facilities are located on the same premises, greater potential savings may be possible because of the added savings in transportation.

To establish a price to the consumer for frozen bread, we must add to the price of 11.1 cents the costs of freezing, the frozen food distributor's margin, and a retail margin that would return to the retailer as much as he receives under present methods plus the costs of facilities needed for storing and displaying frozen bread in the retail store.

The cost of freezing a 1-pound loaf of bread for a medium-sized bakery has been estimated to be 0.5 cent per loaf. 2/ If we assume the markup to the frozen food distributor to be 15.1 percent, which was the average for prepared frozen foods in 1958 (9), this would add another 1.8 cents per loaf. Thus, adding 0.5 cent, 1.8 cents, and the retail margin of 3.1 cents to the 11.1 cents, we get a total of 16.5 cents per 1-pound loaf. Because of the relatively low value of bread per unit of volume it is possible that the average margin accruing to frozen food distributors for prepared frozen foods is too low for bread. Furthermore, certain services are provided by bakery driver salesmen that would not be provided by frozen food distributors at the 1.8 cents margin per loaf.

In addition to the costs and margins already presented, others must be added to cover the difference in retailers' costs of selling the bread frozen over selling it as a dry grocery. Bread is displayed in many retail stores on gondola-type racks 2 feet wide; the racks have an average of 5 shelves, each of which has about 18 inches of usable display space. If bread is stacked 2 loaves deep per shelf, this type of display will hold 60 standard 1-pound loaves of bread per lineal foot of rack. The standard type of frozen food cabinet found in most retail stores is approximately 44 inches wide, outside measurement, and will accommodate about 30 standard loaves per lineal foot of cabinet.

2/ Based on unpublished estimates made by Industrial Analysis Investigations of Western Utilization Research and Development Division, U. S. Department of Agriculture.

If we assume that a frozen bread display is to be the same size as a regular display, the floor space required would be 2 feet by 44 inches for the frozen food cabinet plus an aisle 3 feet wide and 2 feet long in place of each lineal foot of gondola 2 feet wide and requiring an aisle 3 feet wide and 1 foot long. This would result in 2.7 times as much building space for merchandising bread in frozen form as in regular form. According to estimates of building replacement costs and depreciation rates for buildings and equipment supplied by a large supermarket, the replacement costs for gondola racks and frozen food cabinets from price catalogs, and estimates of power requirements and costs from a power company, the annual cost for a 60-loaf display in frozen form is $81.32 more than for the usual type of display. The basic data used for making these cost estimates are given in table 1. This cost difference may be reduced if some of the upright shelf-type freezer display cabinets now in the experimental stage prove to be acceptable. Such cabinets require less floor space per square foot of display than the "deep freeze" type on which the above estimates are based.

Table 1.--Estimated costs and use life for retail grocery store buildings and equipment

Item	Replacement cost 1/	Useful life	Operating costs	Maintenance and repairs
Building.....	$12.00/sq. ft.	25 years	----	----
Gondolas 2/.....	$26.31/lin. ft.	10 years	----	----
Freezer cabinets (25' x 44" outside) 2/.....	$2,073	7 years	----	----
Compressors (5 h.p., 208 V, 3 phase) 2/.....	$1,120	5 years	3/ $24.50/month	4/ $42.00/year

1/ Interest on all items was calculated at 3 percent of the replacement cost per year.
2/ Includes transportation and installation.
3/ Estimated on the basis of 60 percent operation or 2,160 KWH per month.
4/ Based on contract service policy.

The turnover rate for the bread department of retail stores was estimated to be about 2.66 times per week in a Food Town Store study in 1954 (8). A study made in 1957 in Super Valu stores set this rate at about 3.29 times per week. At the 3.29 weekly rate of turnover, and with 60 loaves displayed per 2 lineal feet of freezer cabinet (thus giving annual sales of approximately 10,260 loaves per 2 lineal feet of cabinet), the retailer's cost of selling bread

in frozen form would increase by about 0.8 cent per loaf. This brings the cost of a 1-pound loaf to 17.3 cents, the total price to the consumer for frozen bread. It is a total savings of 2 cents per loaf over the conventional method of handling (fig. 2).

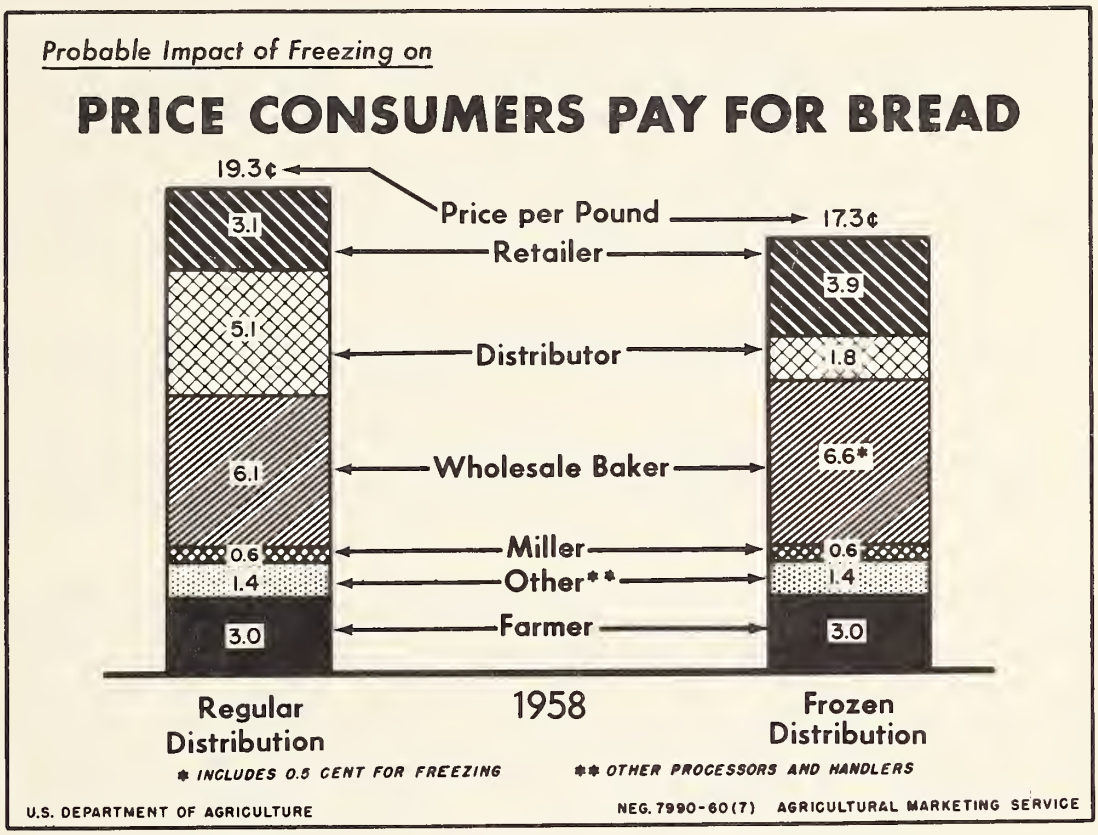

Figure 2

DISCUSSION AND CONCLUSIONS

Cost estimates in the foregoing analysis are based to a certain extent on incomplete and tentative data. The reader should be cautioned to evaluate the potential savings that may be possible if wholesale bakers adopt frozen distribution of bread. All of the factors that potentially could influence costs were not considered. Some of these may result in a less favorable picture for distribution of frozen bread; others may result in greater savings.

A factor that may increase the above cost estimates is that bread displays would have to be maintained by the retailer. Thus, he may require a higher markup for bread than he is now receiving. Furthermore, unless the frozen food distributor delivers frequently enough to keep the display cabinet stocked, the retailer would require some additional backroom frozen storage space. With the assumptions made in this report an average of 3.29 deliveries per

week would be required. The most economic combination of storage space and frequency of deliveries could be ascertained for each individual store's needs.

In favor of frozen distribution, it has been estimated that the net cost of unsold bread returned to the baker-wholesaler by the retailer runs as high as 4.3 percent of the wholesale price valuation, or 2.1 percent of cost (10). In either case, the cost of stales, which is not accounted for in the above estimates, would be entirely eliminated. Another factor that seems to be in favor of frozen distribution is that some baking industry spokesmen believe that if bread were frozen at the peak of its freshness there would be more opportunity for consumers to get uniformly fresh bread at all times. This would probably enhance its appeal and possibly increase sales, particularly in markets that have gone over to a 5-day week in both the production and delivery of bread.

A study made by the U. S. Department of Agriculture indicates that two of the most important factors affecting costs of frozen food distribution are the average size of the order, in dollars, and the productivity of labor in man-hours per given value of sales (2). The physical quantities of product required to yield an order of given dollar size would be relatively large for a bulky low value product like bread. This would have the tendency of increasing the man-hour requirements for a given value of sales.

In the study mentioned, however, none of the variation in operating costs among individual firms could be explained by different product combinations or differences in prices of frozen foods handled. Since most of the currently available frozen foods have a higher value per unit of volume than bread, it seems reasonable to conclude that the average distributor margin of 15.1 percent for these foods may be too low for bread. Therefore, the calculated margin of 1.8 cents per loaf for the frozen food distributor's margin might be lower than the average. On the other hand, for those frozen food distributors who are not operating at capacity, frozen bread would offer an opportunity to spread fixed costs of storage, handling, and selling over a larger product line, and for these distributors the 1.8 cents margin per loaf might be adequate.

Another factor that may reduce distribution costs still further is that with frozen distribution, squeezing of bread loaves by consumers to test their freshness, would be eliminated. This would provide an opportunity for bakers to increase production of denser, more compact bread which already seems to be gaining in popularity in some areas. Such bread requires less storage and display space per pound and would permit further economies in marketing.

One of the possible side effects of distributing bread in frozen form is that the chemical additives that seem to be necessary for preserving the quality of some breads distributed by conventional methods may not be required, thus resulting in another small savings. However, other distribution methods may be employed to achieve equal or possibly even greater economies in marketing bread than those used in frozen distribution. Notable among these are drop-shipments at retail stores, in which case the grocers assume the responsibility of displaying the bread and absorbing the losses on stale bread. Another possibility is delivery of bread by wholesale bakers to retail store distribution

centers for subsequent delivery to retail outlets in mixed loads of groceries. These methods, and others having similar objectives, are already being used by many of the grocery chains.

If wholesale bakers undertook the distribution of frozen bread on a less frequent schedule than at present, and reduced some of the services provided by the driver-salesmen, they could probably achieve distribution costs as low as those of the chains, or as low as those indicated in the above analysis for frozen food distributors. The question as to whether frozen or some other method of distribution would be more efficient would have to be decided by the effect of each method on competition between firms.

On the basis of this information a final appraisal could be made. It would appear that each of the methods that has been proposed to reduce distribution costs of wholesale bakers has as its central point the reduction of some of the services provided by the bakery truck driver. With present selling and distribution practices these services result in promotion of a particular brand. If bread were sold by frozen food distributors, individual bakers undoubtedly would emphasize other--perhaps more costly--forms of promotion.

Slater (10) has attributed the decline route tonnages of wholesale bakers to the fact that over the years corporate and voluntary chains--which have the largest retail stores--have gone over to production, and other forms of control, of their own bread supplies. It is conceivable, however, that part of the decline may have been caused by increasing competition among individual wholesale bakers for display space in the grocery stores. Such competition may well be a result of the control over larger supplies by the chainstores.

One of the practices used by wholesale bakers to maintain their share of display space in retail food outlets is to have their driver-salesmen call back at the stores on their routes at least once and in some cases several times a day to make certain that a particular company's bread has the best possible display position and appearance. However, this reduces the number of stores that a driver can serve in a day. This apparent cost increasing factor, coupled with the inelastic demand for bread (10), thus far has made it possible for increased costs to be passed on to consumers without proportionate losses in sales. This may partially explain the reason for the present wholesale baker, retail grocer type of distribution even though other distribution methods would result in lower distribution costs.

Available evidence indicates enough promise in the possibility of reducing bread marketing costs by the use of frozen distribution to consider it along with other proposed methods of increasing efficiency of wholesale distribution of bread. As was indicated earlier, cost reduction is only one of the factors to be considered in marketing frozen bread. Final appraisal would, of course, depend on acceptance of the plan by wholesale bakers and acceptance by consumers of frozen bread at prices that would cover costs, and return a fair profit to the baker and other marketing agencies.

It is conceivable that in some instances the improved uniformity in freshness of frozen bread would make consumers willing to buy at the same or even higher prices. In this event, frozen bread could be distributed without undue concern over whether it costs less.

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